

# 2003 ANNUAL AIR QUALITY REPORT



FAIRFAX COUNTY HEALTH DEPARTMENT  
DIVISION OF ENVIRONMENTAL HEALTH  
10777 MAIN STREET, FAIRFAX, VA 22030

## **FOREWORD**

This is a technical report summarizing air quality data collected during the calendar year 2003. The Health Department's Division of Environmental Health maintains an air monitoring network in Fairfax County. The report design is intended to meet the needs of concerned County residents and organizations along with public and private administrators whose decisions must reflect air quality considerations. Air quality summary reports have been issued annually since 1973. Persons requiring additional technical information should contact the Air Monitoring Program staff to see if more detailed information is available. Staff can be reached at (703) 246-2400.

The cover photograph is courtesy of Don Sweeney who works for the Park Authority.

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## **ABSTRACT**

The Division of Environmental Health of the Fairfax County Health Department conducts an air monitoring program that conforms to the protocol and criteria set forth in Title 40 of the Code of Federal Regulations Part 50. This annual summary primarily focuses on those air pollutants for which National Ambient Air Quality Standards (NAAQS) have been established by the U.S. Environmental Protection Agency (EPA) under the Federal Clean Air Act.

During 2003, EPA classified the Metropolitan Washington Statistical Area (DC-MD-VA), which includes Fairfax County, as a severe non-attainment area for ground-level ozone. Attainment status was based on the NAAQS 1-hour standard of 0.12 parts per million (ppm). In 2003, this statistical area continued to be in non-attainment of the 1-hour ozone standard.

Fairfax County exceeded the 1-hour ozone standard in 2003. There were 2 days in which at least one monitoring site exceeded the 1-hour ozone standard and 5 days in which at least one monitoring site exceeded the 8-hour ozone standard. There were 3 “unhealthy” days in 2003, as classified by EPA’s Air Quality Index.

In 2004, EPA determined classifications for the more stringent 8-hour ozone standard of 0.08 ppm which will be phased in during 2004. The metropolitan Washington area was classified as moderate non-attainment for this standard. Maryland, Virginia, and Washington, D.C. must submit State Implementation Plans for the 8-hour standard in 2007 and the region must demonstrate compliance by 2010.

Overall, air quality in Fairfax County has been improving. Analysis of pollutant trends since the 1980 time period reveal a steady downward trend in pollutant concentrations for all six criteria pollutants (Carbon Monoxide, Sulfur Dioxide, Nitrogen Dioxide, Ozone, Particulate Matter, and Lead). Fairfax County is in attainment with the National Ambient Air Quality Standards for all criteria pollutants except ozone.

## AMBIENT AIR QUALITY

### A. OVERVIEW

The Division of Environmental Health of the Fairfax County Health Department is authorized by the Fairfax County Code, Chapter 103, in cooperation with Federal and State agencies, to conduct an air monitoring program. The primary purpose of the air monitoring program is to measure the levels of air quality to ensure the protection of human health, welfare and safety, and to the greatest degree feasible, prevent injury to plant and animal life and property. The ambient air monitoring stations are situated in such a manner as to indicate residential, health based pollution concentrations. The objective of this monitoring network is to track ambient air pollutant levels to indicate compliance or non-compliance with Federal standards, to observe effects on pollutant levels from regulatory controls on sources, to develop data for trend analysis, and to provide data for the air quality index and forecasts.

The air quality monitoring program consists of monitoring for the U.S. Environmental Protection Agency (EPA) criteria pollutants, ozone (O<sub>3</sub>), carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), lead (Pb), and particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>). In addition, non-criteria pollutants; total suspended particulates (TSP) and nitric oxide (NO) are monitored along with meteorological parameters for wind, temperature, and rainfall.

The air quality monitoring network consists of the following sites for 2003:

- 5 Continuous monitoring stations for gaseous pollutants\* (Mount Vernon, Franconia, Cub Run, Lewinsville, Mason)
- 7 High volume particulate/lead samplers
- 5 Fractional particulate samplers of 10 micrometers (PM<sub>10</sub>)
- 3 Fractional particulate samplers and 1 continuous particulate sampler of 2.5 micrometers (PM<sub>2.5</sub>)
- 1 Acid deposition station
- 5 Meteorological sites

*\*Ozone is the only criteria pollutant monitored at the Mount Vernon site and Carbon Monoxide is the only pollutant Fairfax County monitors at the Franconia site.*

The data are reduced to both monthly and annual terms and are shown in both tabular and graphical forms to reveal

seasonal and short-term changes that would be obscured by longer term averaging. Comparisons with applicable standards are emphasized. The Air Quality Annual Report is supplemented with two appendices. Appendix A contains a trend analysis and a set of graphs showing multi-year trends for several air pollutants and several independent factors. Appendix B provides a table and a map of the monitoring stations, which includes the location and descriptive information of each of the stations.

Data reduction is done in-house, and the data are placed in a computer database for use in assessing current air quality, identifying air quality trends, and analyzing periods of elevated concentrations. Pollutant data are sent to the U.S. Environmental Protection Agency (EPA) for incorporation into the national Air Quality System database and the Virginia Department of Environmental Quality (VDEQ).

The National Ambient Air Quality Standards (NAAQS), as defined in Title 40 of the Code of Federal Regulations, Part 50, provide a basis for evaluating air quality in Fairfax County. The primary standards define the levels of air quality necessary to protect the public health with an adequate margin of safety. The secondary standards define levels of air quality necessary to prevent any degradation or harm to the total environment.

For this report, gaseous pollutant concentrations are expressed in parts per million (ppm); particulate matter and lead concentrations are expressed in micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ).

## **B. QUALITY ASSURANCE PROGRAM**

A quality assurance/control program is maintained based on requirements stated in Title 40 of the Code of Federal Regulations, Part 58, Appendix A. This quality assurance (QA) program is used to assure that the monitoring data is of the highest quality and to minimize the loss of data due to instrument malfunctions or out of range operating conditions. A database of the precision, accuracy and audit results are maintained on a microcomputer using software developed by EPA, and are submitted on a quarterly basis to the EPA and VDEQ. The Air Quality Monitoring Program also participates in the EPA National Performance Audit program.

## C. CRITERIA POLLUTANTS

### 1. Ozone (O<sub>3</sub>)

Ozone is not emitted directly from pollution sources (i.e. smokestacks, tailpipes), but is formed by a complex series of reactions among nitrogen oxides (NO<sub>x</sub>) and volatile organic compounds (VOCs) under the influence of solar ultraviolet radiation (sunlight). Two significant sources are the incomplete combustion of gasoline from motor vehicles and emissions from stationary sources such as factories, printers, dry cleaners, and paint shops. Ozone is shorter lived than its precursors, which may build up and redistribute geographically over an extended period of calm wind conditions (air stagnation). Therefore, ozone concentrations show a very strong diurnal (daily) and seasonal cyclical character, with the height of the cycles controlled almost entirely by meteorological conditions.

Ozone is an irritant to the respiratory system and causes health problems because it damages lung tissue, reduces lung function and sensitizes the lung to other irritants. Individuals with existing respiratory impairments such as asthmatics have increased sensitivity to the effects of ozone. Healthy adults and children that engage in moderate physical activity are susceptible to the effects of ozone. In addition to health effects, ozone can have an adverse effect on vegetation.

The 1-hour National Ambient Air Quality Standard (NAAQS) for ozone is defined in terms of the daily maximum hourly average. The primary and secondary standards for ozone are 0.12 ppm hourly average concentration. The data is rounded to two decimal places (fractional parts equal to 0.005 are rounded up). The standard is attained when over the three most recent calendar years the average number of exceedant days is not greater than one. An exceedant day is one during which one or more observed hourly concentrations exceed 0.12 ppm. The 8-hour standard for ozone is defined in terms of the daily maximum eight-hour average. To attain the standard, the 3-year average of the fourth-highest daily maximum 8-hour average of continuous ambient air monitoring data over each year must not exceed 0.08 ppm.

EPA promulgated new National Ambient Air Quality Standards for ozone on July 19, 1997. The new primary standard provides increased protection to the public, especially children and at-risk populations. The secondary standard provides protection for vegetation. EPA replaced the current 1-hour NAAQS with an 8-hour standard at a level of 0.08 parts per million (ppm). In 1999 this revised standard was challenged in court by private industry. In February 2001, the U.S. Supreme Court decided to uphold the new ozone standard declaring that EPA's interpretation was in adherence to the constitutionality of the Clean Air Act. On January 24, 2003, EPA reclassified the metropolitan Washington area from serious to severe non-attainment for the 1-hour ozone standard. In April 2004, EPA announced area classifications to implement the 8-hour ozone standard. The metropolitan Washington area was designated as moderate non-attainment for the ozone standard. A State Implementation Plan is due by June 2007 and compliance must be demonstrated in the region by 2010.

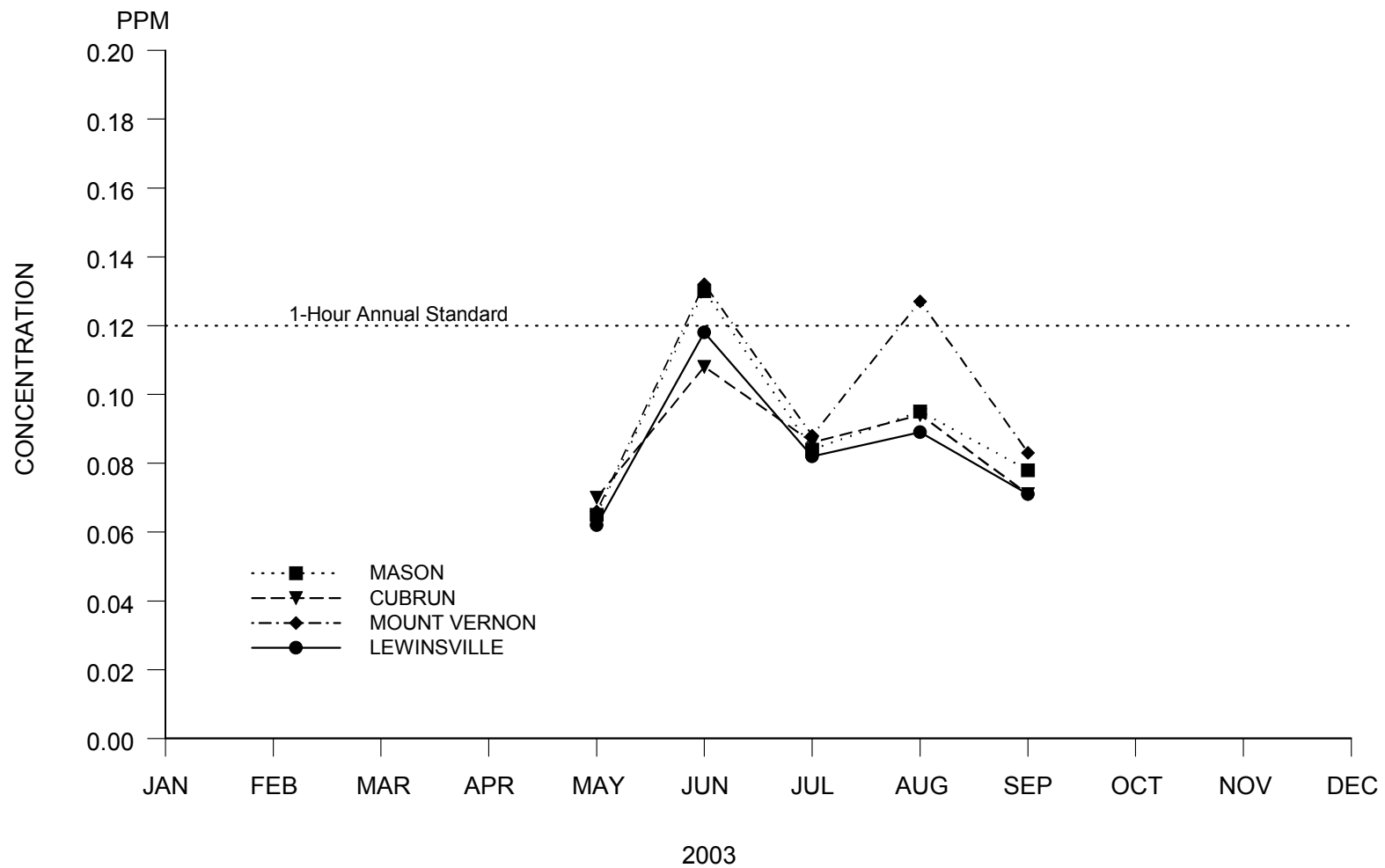
**Table 1: OZONE 1-hour**

	FRANCONIA	MOUNT VERNON	CUB RUN	LEWINSVILLE	MASON
Daily max 1-hour, ppm	0.137	0.132	0.108	0.118	0.130
2 <sup>nd</sup> daily max 1-hour, ppm	0.113	0.127	0.094	0.105	0.112
Valid days measured	205	210	210	204	213
Number of exceedant days	1	2	0	0	1
3 year exceedant average (2001 – 2003)	1.7	1.7	0.3	0.7	1

**Table 2: OZONE 8-hour**

	FRANCONIA	MOUNT VERNON	CUB RUN	LEWINSVILLE	MASON
Daily max 8-hour, ppm	0.123	0.120	0.103	0.112	0.119
4 <sup>th</sup> daily max 8-hour, ppm	0.089	0.091	0.083	0.075	0.083
Valid days measured	205	209	210	202	212
Number of exceedant days	5	5	2	3	3
3 year average, 4 <sup>th</sup> daily max (2001 – 2003)	0.098	0.097	0.089	0.088	0.096

## OZONE MAXIMUM 1-HOUR AVERAGE



## 2. Carbon Monoxide (CO)

Carbon monoxide is a colorless, odorless gas produced by incomplete combustion of carbon compounds in fuels. The primary source of carbon monoxide is motor vehicle exhaust, although other fuel combustion processes such as wood burning stoves, incinerators and industrial sources may be important. Diurnal and seasonal patterns of carbon monoxide concentrations can be detected which correspond to human activities and meteorological factors. Concentrations are generally higher in vicinities of heavy vehicular traffic and fall off rapidly as the distance from a roadway increases. Elevated levels of CO are a winter time phenomena due to inefficient fuel combustion and weather conditions that hamper dispersion. CO is also known to be a participant in the photochemical reactions of ozone formation.

The NAAQS for CO specifies upper limits for one-hour and eight-hour averages. The primary and secondary standards for the 1-hr level are 35 ppm and the 8-hr level is 9 ppm, neither is to be exceeded more than once per year. The 8-hr standard is generally more restrictive.

Carbon monoxide enters the blood stream and reacts chemically with hemoglobin, thereby reducing delivery of oxygen to the body's tissues and organs. The heart and central nervous system are dependent on oxygen utilization; therefore, these are the organ systems most affected by CO exposure. The effects of CO can worsen the conditions of people with chronic heart disease. Other groups more susceptible to the effects of CO are individuals with anemia, pregnant women, infants, elderly people, and fetuses. Low levels of CO exposure may produce symptoms of headache, dizziness, impairment of visual perception, mental function and manual dexterity. High levels may be fatal; however, high exposure levels are unlikely in ambient conditions.



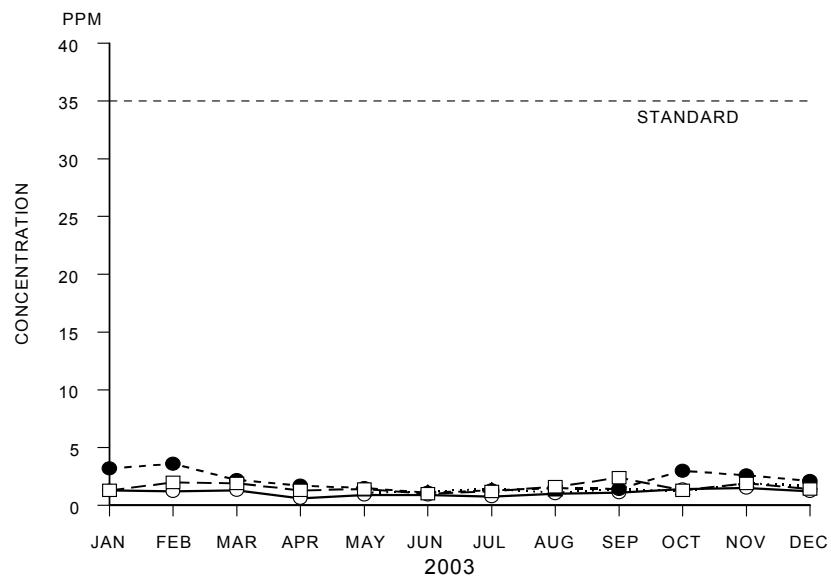
Inside view of monitoring station

**Table 1: Carbon Monoxide**

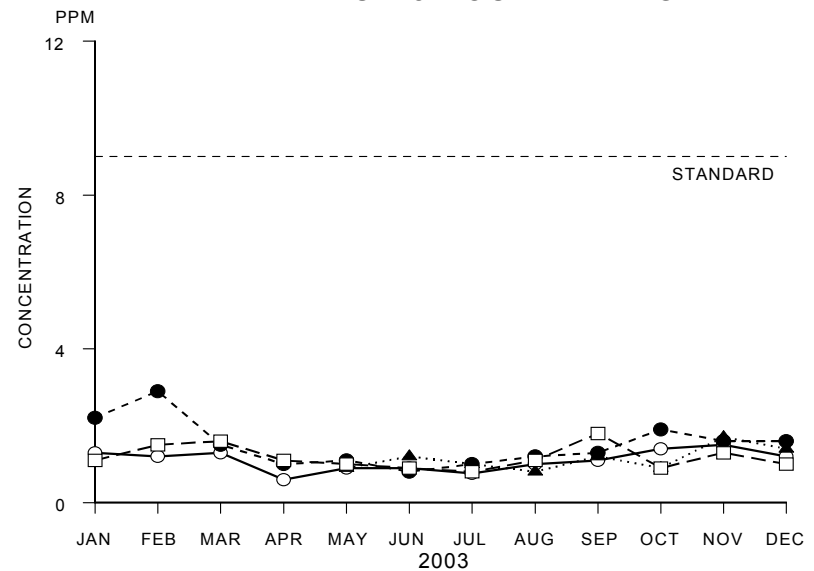
	FRANCONIA	LEWINSVILLE	CUB RUN	MASON
8-hr max readings	1.7	2.8	1.7	1.8
Number of 8-hr conc > 9 ppm	0	0	0	0
1-hr max readings	2.6	3.6	1.9	2.4
Number of 1-hr conc. > 35 ppm	0	0	0	0
Number of 1-hr measurements	8698	8074	5550	8679

## CARBON MONOXIDE

### MAXIMUM 1-HOUR AVERAGE



### MAXIMUM 8-HOUR AVERAGE



#### FEDERAL, STATE, AND COUNTY STANDARDS:

PRIMARY: 1) 35 PPM MAXIMUM 1-HOUR CONCENTRATION,  
NOT TO BE EXCEEDED MORE THAN ONCE PER YEAR.

2) 9 PPM MAXIMUM 8-HOUR CONCENTRATION,  
NOT TO BE EXCEEDED MORE THAN ONCE PER YEAR.

SECONDARY: SAME AS PRIMARY.

—○— FRANCONIA  
 -●- LEWINSVILLE  
 ...▲... CUBRUN  
 -□- MASON



### 3. Sulfur Dioxide (SO<sub>2</sub>)

Sulfur dioxide is formed by the combustion of sulfur containing fossil fuels. SO<sub>2</sub> is produced primarily from coal and oil combustion sources such as electric utilities, steel mills, refineries, pulp and paper mills and nonferrous smelters. Sulfur dioxide is an irritant to the nose, throat, lungs, and eyes. Health effects of SO<sub>2</sub> exposure are highly correlated with particulate pollution. High concentrations may affect breathing and aggravate existing respiratory and cardiovascular disease. Subgroups of the population that are especially susceptible to the effects of SO<sub>2</sub> include asthmatics, individuals with bronchitis or emphysema, children and the elderly. Sulfur dioxide is a primary contributor to acid deposition, through atmospheric chemical conversions, causing acidification of water systems, and damage to trees, crops, buildings and statues.

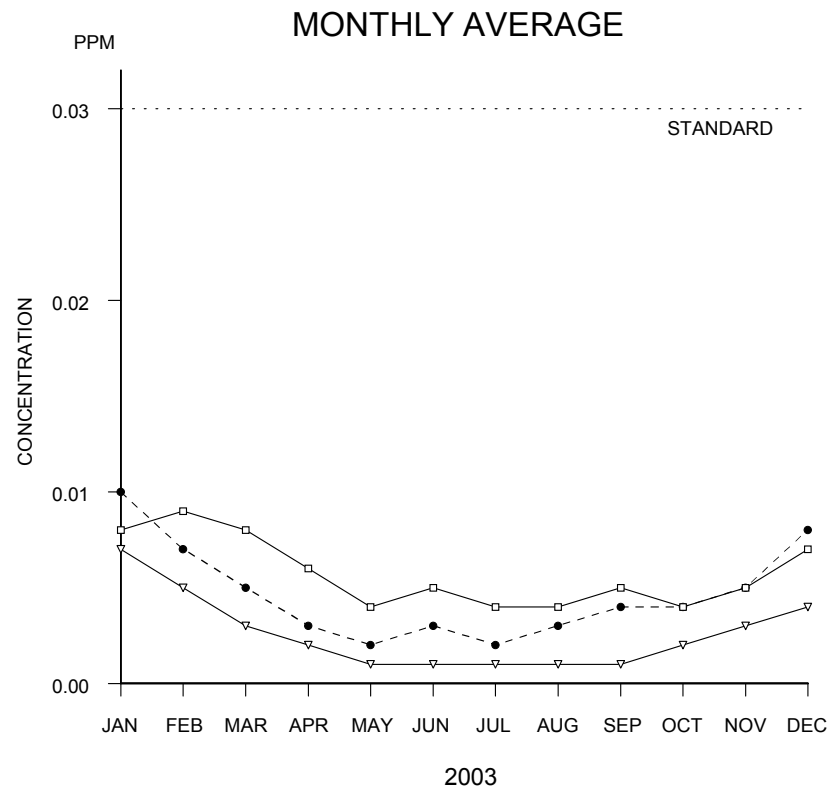
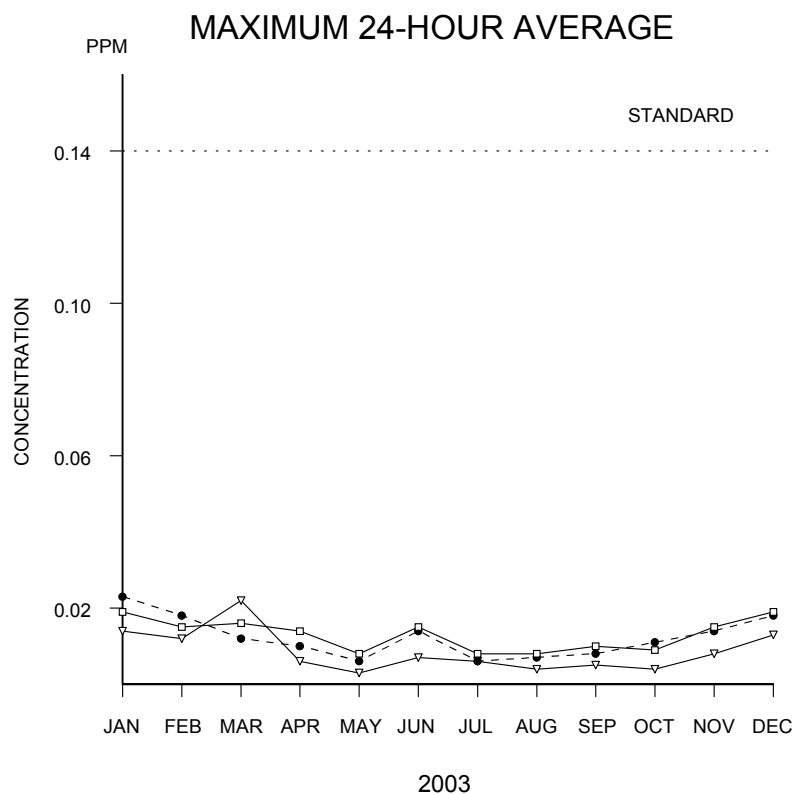
The NAAQS for sulfur dioxide are defined in terms of the annual arithmetic mean concentration, the maximum 24-hour concentration and the maximum 3-hour concentration. The primary standards are expressed in terms of the annual arithmetic mean, set at 0.03 ppm, and the maximum 24-hour concentration, set at 0.14 ppm, which are not to be exceeded more than once per year. The secondary standard is expressed in terms of maximum 3-hour concentration, which is set at 0.5 ppm and is not to be exceeded more than once per year.

**Table 4: Sulfur Dioxide**

	LEWINSVILLE	CUB RUN	MASON
Annual arithmetic mean, ppm	0.005	0.003	0.006
Maximum 24-hr conc., ppm	0.023	0.014	0.020
Maximum 3-hr conc., ppm	0.039	0.028	0.036
Number of 1-hr measurements	8398	8615	8553
Number of 24-hr averages above 0.14 ppm	0	0	0



# SULFUR DIOXIDE



PRIMARY: 1) 0.03 PPM ANNUAL ARITHMETIC MEAN.  
 2) 0.14 PPM MAXIMUM 24-HOUR CONCENTRATION.  
 SECONDARY: 0.5 PPM MAXIMUM 3-HOUR CONCENTRATION,  
 NOT TO BE EXCEEDED MORE THAN ONCE PER YEAR.

—▽— CUB RUN  
 - - - • - - - LEWINSVILLE  
 —□—



#### 4. Nitrogen Dioxide (NO<sub>2</sub>)

Nitrogen dioxide (NO<sub>2</sub>) is a brownish, highly reactive gas that is present in all urban atmospheres. Nitrogen oxides are an important precursor both to ozone (O<sub>3</sub>) and acid rain, and may affect both terrestrial and aquatic ecosystems. The major mechanism for the formation of NO<sub>2</sub> in the atmosphere is the oxidation of the primary air pollutant nitric oxide (NO). NO<sub>x</sub> plays a major role, together with VOCs, in the atmospheric reactions that produce Ozone. It also contributes to the formation of acid deposition. NO<sub>x</sub> forms when fuel is burned at high temperatures. The two major emissions sources are transportation and stationary fuel combustion sources such as electric utility and industrial boilers.

Nitrogen dioxide is a highly reactive oxidant and has a toxic potential. Exposure to ambient concentrations of NO<sub>2</sub> may cause changes in airway responsiveness, lower resistance to respiratory infections, and reduce pulmonary function. Subgroups of the population that are especially susceptible to the effects of NO<sub>2</sub> exposure include children and persons with existing respiratory illness, i.e. asthmatics, emphysema and chronic bronchitis. Studies are not definitive for health effects in healthy individuals. Nitrogen oxides injure vegetation, cause fabrics and dyes to deteriorate, and contribute to metal corrosion.

The NAAQS for nitrogen dioxide are defined in terms of the annual arithmetic mean concentration. The primary and secondary standards are 0.053 ppm.

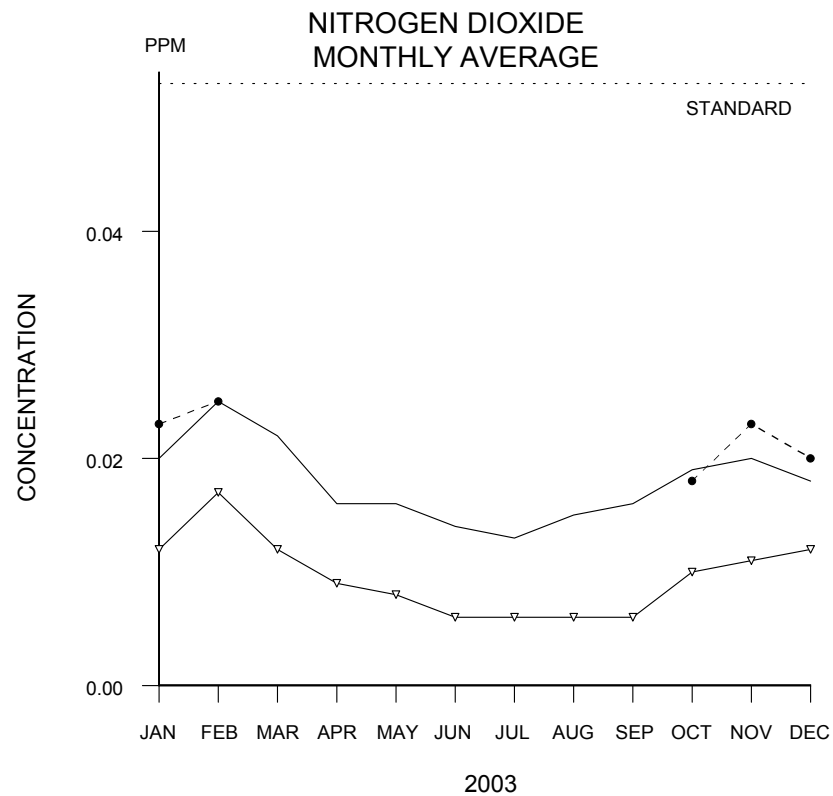
**Table 5: Nitrogen Dioxide**

	CUB RUN	LEWINSVILLE <sup>1</sup>	MASON
<b>NITROGEN DIOXIDE (NO<sub>2</sub>)</b>			
Annual arithmetic mean, ppm	0.010	*	0.018
Maximum 1-hr conc., ppm	0.048	*	0.063
Number of 1-hr measurements	8604	*	8649

\* Lewinsville did not have enough valid data to get annual values due to an instrument malfunction.



# OXIDES OF NITROGEN



FEDERAL, STATE, AND COUNTY STANDARDS:

NITROGEN DIOXIDE:

PRIMARY: 0.053 PPM ANNUAL ARITHMETIC MEAN.

SECONDARY: SAME AS PRIMARY

NITRIC OXIDE: NO STANDARD ESTABLISHED.

\_\_\_\_\_ MASON  
 \_\_\_\_\_ ▽ \_\_\_\_\_ CUBRUN  
 - - - - - ● - - - - - LEWINSVILLE



## 5. Particulate Matter

Particulate matter consists of dust, smoke, and other solid or liquid particles small enough to suspend readily in the air. The particles range in size from very fine (a fraction of a micrometer) to the very coarse (about 1000 micrometers). The chemical and physical properties of particulate matter can vary greatly with time, region, meteorology, and type of source. Particulate matter has been associated with increased respiratory symptoms and illnesses in children and adults, and at very high levels has been shown to produce mortality in the elderly and ill.

The Environmental Protection Agency (EPA) revised the NAAQS for particulate matter on July 18, 1997. EPA added standards for particulate matter 2.5 micrometers and below ( $PM_{2.5}$ ) and revised the form of the 24-hour standard for particulate matter 10 micrometers and below ( $PM_{10}$ ).  $PM_{2.5}$  standards are intended to protect against exposures to fine fraction particle pollution and the  $PM_{10}$  standards are intended to protect against coarse fraction particles. The constitutionality of these revised standards was challenged by private industry in the Courts in 1999. On February 27, 2001, the U.S. Supreme Court issued a ruling to vacate the revised  $PM_{10}$  standard. The Court ruled that the new  $PM_{2.5}$  should remain in place; however, this standard could be vacated “if the presence of this standard threatens a more imminent harm”. The “harm” refers to the burden on sources complying with the regulations.

Fairfax County continues to monitor total suspended particulate (TSP), which is used to evaluate nuisance impacts that cause damage, annoyance, or unreasonable interference with the enjoyment of life and property.

### a. Total Suspended Particulate (TSP)

The TSP measure is the weight of material in a unit volume of air, without regard to the size of the particles. The TSP sampler collects particulate matter up to a nominal size (aerodynamic diameter) of 50 micrometers. Each sample is collected during a 24-hour period, midnight to midnight. A maximum of 61 samples was scheduled for each station during 2003.

County primary and secondary standards are  $60 \mu\text{g}/\text{m}^3$  for annual geometric mean and  $150 \mu\text{g}/\text{m}^3$  for maximum 24-hour concentration, the 24-hour concentration is not to be exceeded more than once per year.



TSP collocated samplers at Gunston monitoring site

**Table 6: Total Suspended Particulates**

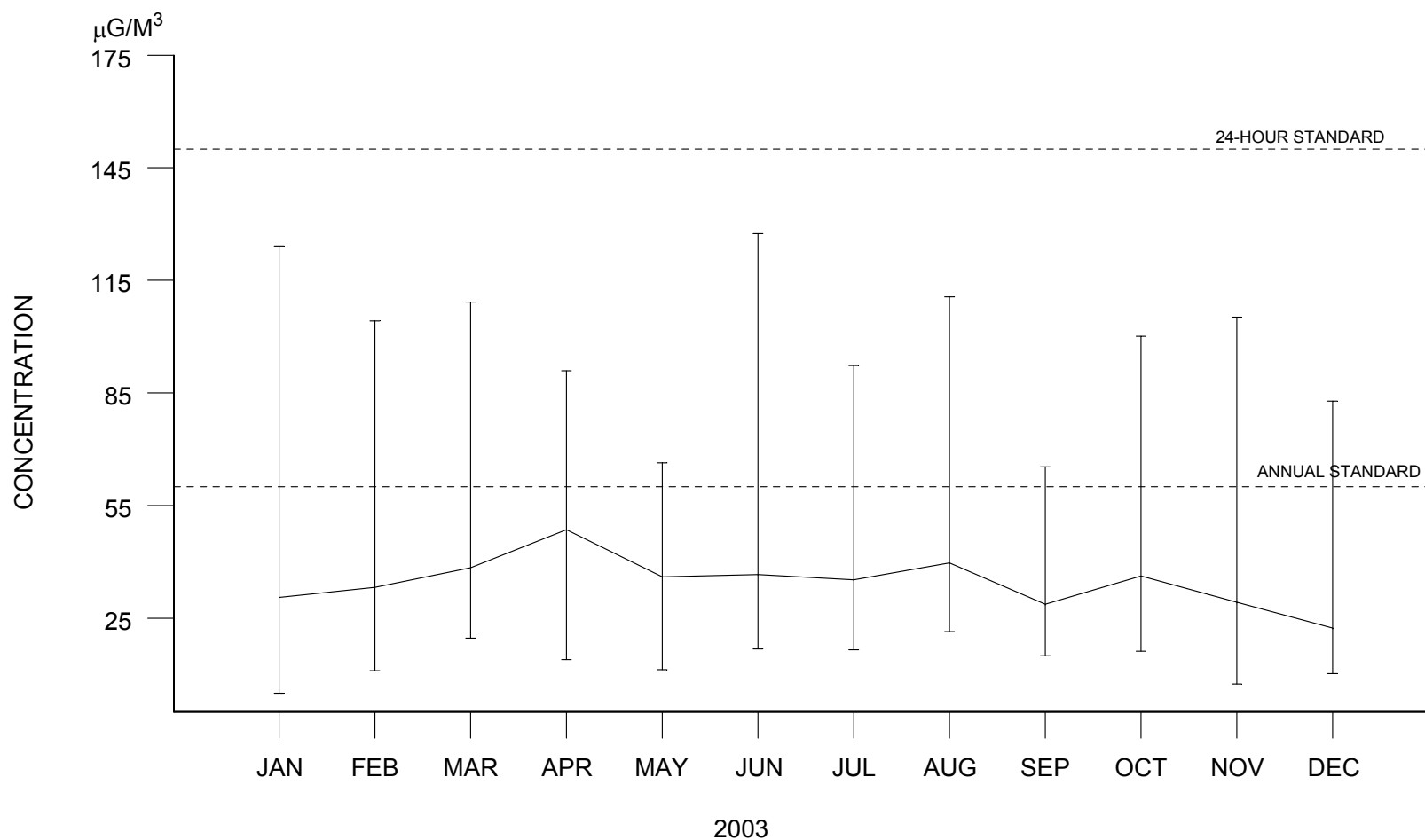
	BUSH HILL	CLERMONT	THOMAS EDISON	GUNSTON	I-95	OCCOQUAN HILL	SPRINGFIELD	ALL STATIONS
Number of samples	61	60	57	60	58	60	61	417
Annual geometric mean, $\mu\text{g}/\text{m}^3$	25.23	25.16	34.59	23.26	54.42	39.80	33.68	32.37
Maximum 24-hr sample, $\mu\text{g}/\text{m}^3$	72.4	84.7	94.0	70.8	124.1	127.4	90.9	127.4

**Table 7: Total Suspended Particulates**  
Monthly Geometric Mean,  $\mu\text{g}/\text{m}^3$ 

	BUSH HILL	CLERMONT	THOMAS EDISON	GUNSTON	I-95	OCCOQUAN HILL	SPRINGFIELD	ALL STATIONS
January	20.13	20.78	42.45	21.37	50.11	34.86	24.30	30.57
February	26.42	26.06	40.80	22.40	47.12	28.52	41.01	33.19
March	27.20	27.50	36.60	24.61	72.93	37.00	41.10	38.42
April	45.37	47.85	48.78	43.49	--- <sup>1</sup>	53.48	52.72	48.62
May	27.19	29.03	37.25	25.93	55.19	37.97	39.16	35.96
June	26.19	26.91	40.13	25.57	60.45	44.42	32.46	36.59
July	26.33	26.60	36.89	24.17	55.14	41.60	35.54	35.18
August	28.59	28.13	35.51	26.35	64.74	52.99	42.04	39.76
September	24.72	21.97	30.69	18.72	38.54	36.69	29.9	28.75
October	25.66	22.17	31.08	26.35	70.69	44.00	33.58	36.22
November	20.36	19.98	24.03	17.52	58.78	38.36	25.37	29.20
December	14.61	14.78	21.11	13.44	37.71	34.86	20.42	22.42

<sup>1</sup> I-95 did not have enough valid data for a monthly geometric mean due to an instrument malfunction.

## TOTAL SUSPENDED PARTICULATES MONTHLY GEOMETRIC MEAN WITH MAXIMUM / MINIMUM 24-HOUR SAMPLES



COUNTY STANDARDS:

60 µG/M³ ANNUAL GEOMETRIC MEAN.

150 µG/M³ MAXIMUM 24-HOUR CONCENTRATION, NOT TO BE EXCEEDED MORE THAN ONCE PER YEAR.

COMPOSITE AVERAGE



**b. Particulate Matter 10 Micrometers (PM<sub>10</sub>)**

The PM<sub>10</sub> measurement is a size specific indicator of particulate matter in the ambient air. The PM<sub>10</sub> sampler collects particulates with an aerodynamic diameter less than or equal to a nominal 10 micrometers. The PM<sub>10</sub> measure is the weight of this size specific material in a unit volume of air.

The NAAQS are defined in terms of the 24-hour average concentration and the annual arithmetic mean. The primary standard for 24-hour average concentration is 150  $\mu\text{g}/\text{m}^3$ . The standard is attained when the expected number of days per calendar year with a concentration above 150  $\mu\text{g}/\text{m}^3$  is equal to or less than one. The primary standard for annual arithmetic mean is 50  $\mu\text{g}/\text{m}^3$ . The standard is attained when the 3-year average of the annual arithmetic PM<sub>10</sub> concentrations at each monitor within an area is less than or equal to 50  $\mu\text{g}/\text{m}^3$ .



PM<sub>10</sub> sampler at Occoquan Hill site



PM<sub>10</sub> with filter exposed

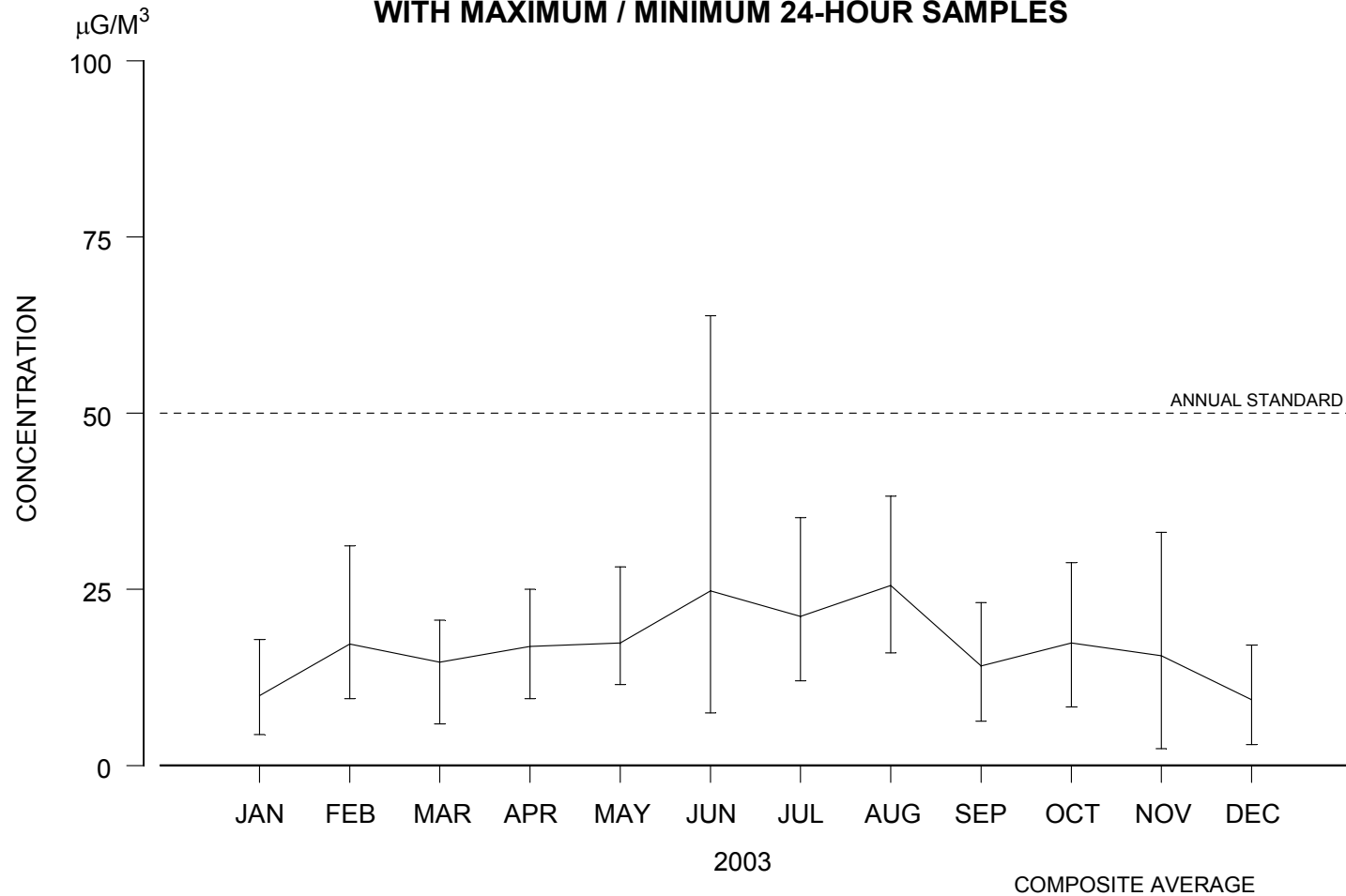
**Table 8: Particulate Matter 10 Micrometers**

	CUB RUN	LUCK	MOUNT VERNON	OCCOQUAN HILL	SPRINGFIELD	ALL STATIONS
Number of samples	57	59	48	60	59	283
Annual arithmetic mean, $\mu\text{g}/\text{m}^3$	15.11	17.43	17.53	16.52	18.61	17.04
Maximum 24-hr sample, $\mu\text{g}/\text{m}^3$	52.0	62.6	63.8	62.5	60.6	63.8
24-hr samples above $150 \mu\text{g}/\text{m}^3$	0	0	0	0	0	0

**Table 9: Particulate Matter 10 Micrometers**  
Monthly Arithmetic Mean,  $\mu\text{g}/\text{m}^3$ 

	CUB RUN	LUCK	MOUNT VERNON	OCCOQUAN HILL	SPRINGFIELD	ALL STATIONS
January	9.35	9.42	10.35	8.62	11.92	9.93
February	13.78	16.06	20.22	13.09	23.18	17.27
March	13.14	15.50	15.75	12.36	16.52	14.65
April	16.28	16.30	16.64	16.93	18.42	16.91
May	15.91	17.01	17.63	16.75	19.63	17.39
June	22.84	27.59	25.62	23.85	23.99	24.78
July	19.46	21.89	21.13	21.44	21.80	21.14
August	23.09	27.40	25.66	25.12	26.43	25.54
September	9.86	15.75	15.67	15.19	14.18	14.13
October	14.08	17.87	17.68	16.66	20.60	17.38
November	14.83	12.94	---	19.04	15.63	15.61
December	8.72	11.42	6.44	9.21	10.97	9.35

# **PARTICULATE MATTER PM<sub>10</sub> MONTHLY ARITHMETIC MEAN WITH MAXIMUM / MINIMUM 24-HOUR SAMPLES**



PRIMARY: 50 µG/M³ ANNUAL ARITHMETIC MEAN, 3-YEAR AVERAGE OF ANNUAL VALUES  
MUST BE LESS THAN OR EQUAL TO 50 µG/M³.  
150 µG/M³ 24-HOUR CONCENTRATION, EXPECTED NUMBER OF DAYS PER CALENDAR YEAR  
WITH A CONCENTRATION ABOVE 150 µg/m³ IS EQUAL TO OR LESS THAN ONE.



**c. Particulate Matter 2.5 Micrometers (PM<sub>2.5</sub>)**

The PM<sub>2.5</sub> measurement is a size specific indicator of particulate matter in the ambient air. The PM<sub>2.5</sub> sampler collects particulates with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers. The PM<sub>2.5</sub> measurement is the weight of this size specific material in a unit volume of air.

The new primary annual PM<sub>2.5</sub> standard is set at 15  $\mu\text{g}/\text{m}^3$ , annual arithmetic mean. The annual standard is attained when the 3-year average of the annual arithmetic mean PM<sub>2.5</sub> concentrations is less than or equal to 15  $\mu\text{g}/\text{m}^3$  from single or multiple community-oriented monitors. The new primary 24-hour PM<sub>2.5</sub> standard is set at 65  $\mu\text{g}/\text{m}^3$ . The 24-hour PM<sub>2.5</sub> standard is attained when the 3-year average of the 98th percentile of the 24-hour PM<sub>2.5</sub> at each population-oriented monitor within an area is less than or equal to 65  $\mu\text{g}/\text{m}^3$ .

The PM<sub>2.5</sub> monitoring network has been put in place in Fairfax County and quality assurance procedures for the samplers developed by EPA and the Virginia Department of Environmental Quality (VADEQ) have been implemented. Sampling for PM<sub>2.5</sub> started in January 1999.

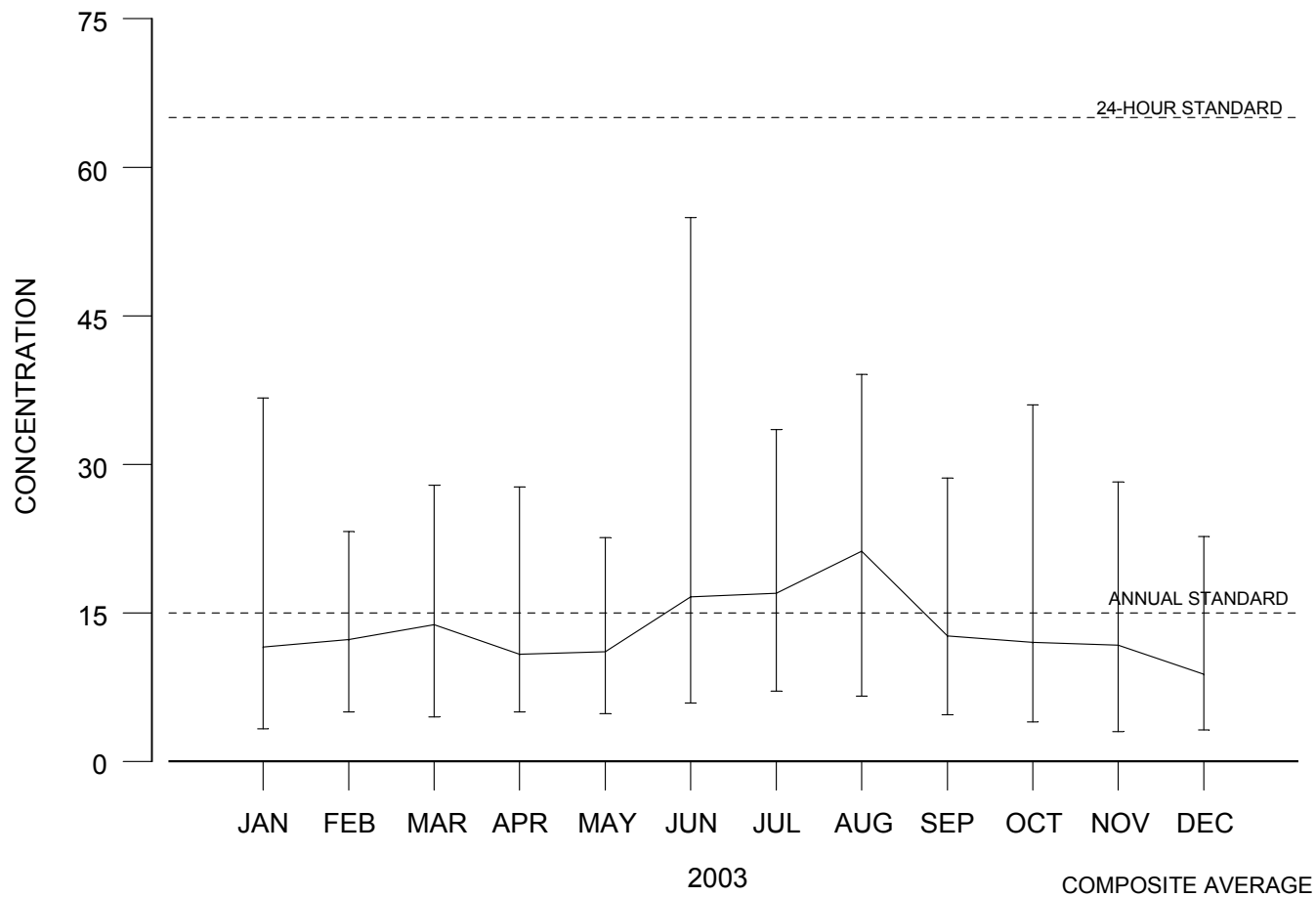


PM 2.5 sampler

**Table 10: Particulate Matter 2.5 Micrometers**  
Monthly Arithmetic Mean,  $\mu\text{g}/\text{m}^3$

	FRANCONIA	LEWINSVILLE	MASON
January	11.2	11.4	12.0
February	13.0	12.0	11.9
March	11.4	15.0	15.1
April	11.1	10.7	10.7
May	10.7	11.8	10.7
June	18.1	15.0	16.8
July	18.4	17.5	15.2
August	19.5	22.6	21.6
September	12.9	12.0	13.2
October	12.6	12.1	11.5
November	11.3	12.5	11.4
December	9.3	8.7	8.4
Number of Observations	347	106	110
Maximum Value	54.9	39.1	54.2
Annual Mean	13.2	13.6	13.2

# **PARTICULATE MATTER<sub>2.5</sub> MONTHLY ARITMETIC MEAN** **WITH MAXIMUM / MINIMUM 24-HOUR SAMPLES**



PRIMARY: 15  $\mu\text{G}/\text{M}^3$  ANNUAL ARITHMETIC MEAN, 3-YEAR AVERAGE OF ANNUAL VALUES

MUST BE LESS THAN OR EQUAL TO 15  $\mu\text{G}/\text{M}^3$  FROM SINGLE OR MULTIPLE COMMUNITY ORIENTED MONITORS.

65  $\mu\text{G}/\text{M}^3$  24-HOUR CONCENTRATION, 3-YEAR AVERAGE OF THE 98<sup>th</sup> PERCENTILE

AT EACH POPULATION-ORIENTED MONITOR IS LESS THAN 65  $\mu\text{G}/\text{M}^3$

SECONDARY: SAME AS PRIMARY.

